Design of Telemetry System for Galileo Support

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Abstract

The unique requirements for supporting the Galileo mission using a Low Gain Antenna have forced the Deep Space Net work (])SN) to adopt a new st rategy for telemetry dat a processing. This strategy is implemented mostly in the new Deep Space Complex Communications Galileo Telemetry subsystem (DGT). The support configuration and telemetry processing of the DGT will be described.

The system consists of two parallel telemetry processing strings: a real-lime string and n(m-rcfil-time string. The real-lime string utilizes a receiver, a symbol combiner ant] a feedback decoder, and the nm-real-t ime st ring employs a front end recorder, a ful I spectrum combiner, a demodulator and the same feedback decoder. Maximum utilization of the system is achieved through (1) close interaction between assemblies within the system as well as between tracking stations duri ng hatd-over periods, (2) properly partitioning the functions of the two strings so that real-lime string processes non-problematic data while non-rca]-lime siring focueses on data gaps. Gap processing, with adaptive algorithm distinguish this system from other systems currently avail able in the Deep Space Net work. Maximum use of commercial-off-t he-shelf equipment reduces the development effort and increases the feasibility of upgrades.

The system supports intercontinental arraying between Goldstone, California and Canberra, Australia. Pitfalls associated with long-distance array ing in real-lime and remedies to minimize the operational burden will be discussed. 1 discussion of possible applications of the developed system is also given.